

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No. MO-0109274

Owner: Village of Freistatt
Address: 105 E. Third Street, Freistatt, MO 65654

Continuing Authority: Same as above
Address: Same as above

Facility Name: Freistatt WWTF
Facility Address: N. Hwy H, Freistatt, MO 65654

Legal Description: SW¼, NE¼, Sec. 29, T27N, R27W, Lawrence County
Receiving Stream: Unnamed Tributary to Spring River (U)
First Classified Stream and ID: Spring River 2 (P) (03164)
USGS Basin & Sub-watershed No.: (11070207-010004)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

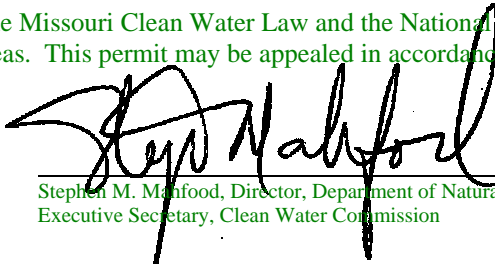
Outfall #001 – POTW / Sewerage Works - SIC #4952 / 4952

Single cell lagoon / spray irrigation / sludge retained in lagoon.

Design population equivalent is 234.
Design flow is 234,000 gallons per day (dry weather flows).
Design sludge production is 3.5 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

July 13, 2004
Effective Date


Stephen M. Mahford, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

July 12, 2009
Expiration Date
MO 780-0041 (10-93)

R. Bruce Martin, Director, Southwest Regional Office

FACILITY DESCRIPTION (continued)

Outfall #001 – Irrigation System Design

Receiving Stream Watershed: within two (2) miles of a losing stream

Facility Type: No-discharge Storage & Irrigation System for year round flows into lagoon.

Cell #001

<u>Lagoon Dimensions:</u>	<u>(Length x Width)</u>	<u>Surface Area</u>	<u>Depth from Bottom</u>
Inside Top Berm:	288' x 288'	82,944 sq.ft.	by <u>13</u> feet depth
Freeboard: (top berm to spillway):			<u>3</u> feet depth
Maximum operating level:			<u>9</u> feet depth
Minimum operating level:			<u>2</u> feet depth
Berm top width:	<u>17</u> feet		

Land Application:

Irrigation volume per year:	8,858,678 gallons (including 1-in-10 year flows)
Irrigation areas:	8.5 acres at design loading
Application rates per acre:	0.04 inch / hour; 0.105 inch / day; 0.738 inches / week; 38.38 inches / year
Field slopes:	Less than 03 percent
Equipment type:	Sprinklers
Vegetation:	Pasture
Application rate is based on:	Hydraulic loading rate

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 3 of 11	
PERMIT NUMBER MO-0109274						
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 – Emergency Discharge from Lagoon (Note 1)						
Flow	MGD	*		*	once/day**	24 hr. estimate
Biochemical Oxygen Demand ₅ ***	mg/L		65	45	once/week**	grab
Total Suspended Solids***	mg/L		110	70	once/week**	grab
pH – Units	SU	****		****	once/week**	grab
Fecal Coliform	#/100mL	1000		400	once/week**	grab
Ammonia Nitrogen as N	mg/L	*****		*****	once/week**	grab
Temperature (degrees)	C°	*****		*****	once/week**	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>OCTOBER 28, 2004</u> .						
Outfall #001 – Land Application Operational Monitoring (Notes 2 & 3)						
Lagoon Freeboard	feet	*			once/month	measured
Irrigation Period	hours	*			daily	total
Volume Irrigated	gallons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches / acre	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>OCTOBER 28, 2004</u>						
Outfall #001 – Irrigated Wastewater (Notes 4 & 5)						
pH – Units	SU	****			once/quarter	grab
Total Kjeldahl Nitrogen as N	mg/L	*			once/quarter	grab
Nitrate / Nitrite as N	mg/L	*			once/quarter	grab
Ammonia Nitrogen as N	mg/L	*			once/quarter	grab
Total Phosphorus as P	mg/L	*			once/quarter	grab
Fecal Coliform	#/100mL	200			once/quarter	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>OCTOBER 28, 2004</u> . THERE SHALL BE NO DISCHARGE OF FLOATING OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
B. STANDARD CONDITIONS						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I & III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 4 of 11	
PERMIT NUMBER MO-0109274						
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		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u> – Ground Water Monitoring Wells						
Groundwater Depth	feet	*			once/month	*****
Nitrate / Nitrite as N	mg/L	10			once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>OCTOBER 28, 2004</u> . THERE SHALL BE NO DISCHARGE OF FLOATING OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
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MO 780-0010 (8/91)

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- * Monitoring requirement only.
- ** Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period. Reports shall be submitted by the 28th day of the month following the reporting period, e.g. Reporting period is the 1st quarter (sample collected weekly, daily, monthly or quarterly), report due by April 28th.
- *** This facility is required to provide a 30-day average percent removal of at least 65%.
- **** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.0 pH units.
- ***** Comply with water quality standards per Special Conditions #5.
- ***** Measure depth of groundwater as feet below the ground surface.

Note 1 - No-discharge Facility requirements: Wastewater shall be stored and land applied during suitable conditions so that there is no-discharge from the lagoon or irrigation site. An emergency discharge may occur when excess wastewater has accumulated above feasible irrigation rates due to precipitation exceeding the 1-in-10 year 365 day rainfall or the 25-year-24-hour storm event.

Note 2 Records shall be maintained and summarized into an annual operating report, which shall be submitted by **January 28th** of each year for the previous calendar year. The report shall include the following:

- a. Record of maintenance and repairs during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;
- b. The number of days the lagoon has discharged during the year, the discharge flow, the reasons discharged occurred and effluent analysis performed; and
- c. A summary of the irrigation operations including freeboard at the start and end of the irrigation season, the number of days of irrigation for each month, the total gallons irrigated, the total acres used, crops grown, crop yields per acre, the application rate in inches per acre per day and for the year, the monthly and annual precipitation received at the facility and summary of testing results.

Note 3 – Lagoon freeboard shall be reported as lagoon water level in feet below the overflow level. See Special Conditions for Wastewater Irrigation System requirements.

Note 4 – Wastewater that is irrigated shall be sampled at the irrigation pump or wet well.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Note 5 – Monitor once per quarter in the months of **March, June, September, and December**. Reports shall be submitted by the 28th day of the month following the reporting period, e.g. Reporting period is the 1st quarter (sample collected in March), report due by April 28th.

C. SPECIAL CONDITIONS

1. Report as no-discharge when a discharge does not occur during the reporting period.
2. Outfalls must be marked in the field and on the topographic site map submitted with the permit application.
3. Permittee will cease discharge by connection to area wide wastewater treatment system within 180 days of notice of its availability.
4. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

- (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) One hundred micrograms per liter (100 µg/L);
 - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
 - (4) The level established in Part A of the permit by the Director.
- (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

5. Water Quality Standards

- (a) Discharges to waters of the state shall not cause a violation of water quality standards rule 10 CSR 20-7.031, including both specific and general criteria.
- (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
 - (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
 - (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
 - (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
 - (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
 - (5) There shall be no significant human health hazard from incidental contact with the water;
 - (6) There shall be no acute toxicity to livestock or wildlife watering;

C. SPECIAL CONDITIONS (continued)

5. Water Quality Standards (continued)

(c) General criteria (continued)

- (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
- (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

6. This permit may be reopened and modified, or alternatively revoked and reissued, to:

- (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
 - (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
 - (2) controls any pollutant not limited in the permit.
- (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
- (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

7. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities

- (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.
- (b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids that are removed from the domestic wastewater treatment lagoon during lagoon clean out and maintenance activities. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids from the lagoon. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

8. Lagoons and earthen basins shall have a liner that is designed, constructed and maintained in accordance with 10 CSR 20-8.020(13)(A)4. If operating records indicate excessive percolation, the department may require a water balance test in accordance with 10 CSR 20-8.020(16) or other investigations to evaluate adequacy of the lagoon seal. The department may require corrective action as necessary to eliminate excess leakage.

C. SPECIAL CONDITIONS (continued)

9. Wastewater Irrigation System

- (a) Discharge Reporting. Any unauthorized discharge from the lagoon or irrigation system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.
- (b) Irrigation Design. Permittee shall operate the land application system in accordance with 10 CSR 20-8.020(15). Permittee shall operate the land application system in accordance with the design parameters listed in the Facility Description section of this permit:
 - (1) No-discharge System. When the Facility Description is “No-discharge”, wastewater must be stored and irrigated at appropriate times. There shall be no-discharge from the irrigation site or storage lagoon except due to precipitation exceeding either the 1-in-10 year rainfall event for the design storage period or the 25-year-24-hour rainfall event.
- (c) Lagoon Operating Levels – No-discharge Systems. The minimum and maximum operating water levels for the storage lagoon shall be clearly marked. Each lagoon shall be operated so that the maximum water elevation does not exceed one foot (1') below the overflow point except due to any exceedance of the 1-in-10 year or 25-year-24-hour rainfall events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage lagoon(s) shall be lowered to the minimum operating level prior to each winter by November 30th.
- (d) Emergency Spillway. Lagoons and earthen storage basins should have an emergency spillway to protect the structural integrity of earthen structures during operation at near full water levels and in the event of overflow conditions. The spillway shall be at least one foot (1') below the top of berm. The department may waive the requirement for overflow structures on small existing basins.
- (e) General Irrigation Requirements. The wastewater irrigation system shall be operated so as to provide uniform distribution of irrigated wastewater over the entire irrigation site. A complete ground cover of vegetation shall be maintained on the irrigation site unless the system is approved for row crop irrigation. Wastewater shall be land applied only during daylight hours. The wastewater irrigation system shall be capable of irrigating the annual design flow during an application period of less than 100 days or 800 hours per year.
- (f) Saturated / Frozen Conditions. There shall be no irrigation during frozen, snow covered, or saturated soil conditions. There shall be no irrigation on days when more than 0.2 inches of precipitation is received or when there is observation by operator of an imminent or impending rainfall event.
- (g) Buffer Zones. There shall be no irrigation within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal; 100 feet of gaining streams or tributaries; 150 feet of dwellings; or 50 feet of the property line.
- (h) Public Access Restrictions. Public access shall not be allowed to the irrigation site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(B)(5).
- (i) Equipment Checks During Irrigation. The irrigation system and application site shall be visually inspected at least once per hour during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.
- (j) Operation and Maintenance Manual. The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to the departments' Water Pollution Control Program and the appropriate Regional Office for review and approval. The O&M Manual shall be reviewed and updated at least every five years.

C. SPECIAL CONDITIONS (continued)

10. Nutrient Management

- (a) Nitrogen. The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
- (b) Phosphorus. When soil test phosphorus (P) levels are above 120 pounds per acres using Bray P-1 test method, the sludge application rate shall not exceed the annual crop requirements for available phosphorus in accordance with state NRCS guidelines. When state NRCS standards and guidelines become available, the permit will be revised to include the Phosphorus Threshold and Phosphorus Index methods to be developed under the USDA, NRCS National Policy, General Manual, Part 402.06.
- (c) The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual sludge and soil testing results and crop requirement. If crop yields are less than that predicted in the permit application, the application rates must be reduced or the yields increased through appropriate changes in management practice.
- (d) This permit will be modified to require a Nutrient Management Plan (NMP) after promulgation of applicable state, EPA and USDA rules and guidelines. The NMP will replace the current PAN and phosphorus methods.

11. Plant Available Nitrogen (PAN) Procedure

- (a) Wastewater, sludge and fertilizer nitrogen application shall not exceed the crop nitrogen requirements based on realistic crop yield goals and the Plant Available Nitrogen (PAN) method. The wastewater application rate shall be calculated as follows:

$$\text{PAN} = \text{CNR} - \text{CFN}$$

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.
 CNR = Crop Nitrogen Requirement in pounds N/acre.
 PAN = Plant Available Nitrogen in wastewater and sludge expressed as annual pounds N/acre.
 SRN = Soil Residual Nitrogen in pounds N/acre.

- (b) Plant Available Nitrogen (PAN) is calculated as follows:

$$\begin{array}{rclcl} \text{PAN} = & [\text{Ammonia Nitrogen}] & \times & & [\text{Availability Factor}] \\ & + \text{ [Organic Nitrogen]} & \times & & [\text{Availability Factor}] \\ & + \text{ [Nitrate Nitrogen]} & \times & & [\text{Availability Factor}] \end{array}$$

For anaerobic treated wastewater and sludge, the nitrate nitrogen amounts will be negligible and can be ignored.

C. SPECIAL CONDITIONS (continued)

11. Plant Available Nitrogen (PAN) Procedure (continued)

(c) Plant Available Nitrogen (PAN) Availability factors are as follows:

(1) Average Availability factors for all fields:

Types of Nitrogen	Surface Application	Immediate Incorporation or Subsurface Injection
Organic	0.10 – 0.70*	0.10 – 0.70*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

* Organic Nitrogen = [Total Kjeldahl Nitrogen as N] – [Ammonia as N]. Availability Factors based on time after application and waste type are:

Type of Wastewater And Sludge Treatment Method	Organic Nitrogen Availability Factor by Time Period			
	Year	Year	Year	Cumulative
	1	2	3	Year 3+
Wastewater storage (aerobic or anaerobic)	0.40	0.20	0.10	0.70
Sludge storage (< 2 years storage time)	0.40	0.20	0.10	0.70
Lime Stabilized Sludge	0.40	0.20	0.10	0.70
Aerobic Sludge Digester	0.30	0.15	0.08	0.53
Anaerobic Sludge Digester	0.20	0.10	0.05	0.35
Sludge retained in wastewater treatment lagoon (35 lbs. BOD/acre loading and > 15 years sludge retention)	0.20	0.10	0.05	0.35
Composted Sludge (Class A)	0.10	0.05	0.03	0.18

NOTES: Year 1 is the current year of waste application; year 2 is the previous year of waste application; and year 3 is waste application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when waste is applied in consecutive years. The cumulative factor is used when waste is applied at about the same rate for 3 consecutive years or longer.

** Average inorganic nitrogen availability based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for all fields or may adjust the N availability based on site specific soil conditions using the following tables under 'field Specific Availability Factors for Inorganic Nitrogen'.

C. SPECIAL CONDITIONS (continued)

11. Plant Available Nitrogen (PAN) Procedure (continued)

(c) Plant Available Nitrogen (PAN) Availability factors are as follows: (continued)

(2) Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factors on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

Table A. Alternate Field Specific Availability Factors for Surface Application					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively Well drained	Well Drained	Moderately Well drained	Somewhat Poorly Drained	Poorly Drained
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19
Adapted from USDA – NRCS, national Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.					

Table B. Alternate Field Specific Availability Factors for Sub-Surface Injection or Immediate Incorporation.					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively Well drained	Well Drained	Moderately Well drained	Somewhat Poorly Drained	Poorly Drained
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24
Adapted from USDA – NRCS, national Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.					

(d) Soil Residual Nitrogen (SRN).

(1) For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

$$\text{SRN in pound N/acre}^* = [\text{percent organic matter}] \times \text{Soil Availability Factor}$$

Soil Availability Factor By Soil CEC Ranges and Organic Matter				
Growing Season	Organic Matter	CEC <10	CEC 10-18	CEC >18
Summer	1%	40*	20	10
Winter	1%	20*	10	5

***Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pound nitrogen for summer and 30 pounds for winter.

(2) For Perennial Crops the SRN is considered zero (0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.

C. SPECIAL CONDITIONS (continued)

11. Plant Available Nitrogen (PAN Procedure) (continued)

- (e) Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.
- (f) If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.
- (g) PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.
- (h) Conversion Factors for laboratory testing results:

$$[\text{mg/L or mg/kg or ppm}] \times [\text{conversion factor}] = [\text{pounds per Unit Volume}]$$

<u>Unit Volume</u>	<u>Conversion Factors</u>
1 lbs/acre inch	0.226
1 lbs/1,000 gallons	0.0083
1 lbs/100 cubic feet	0.0062
1lbs/ton (wet wt)	0.002

- (i) Alternate nitrogen availability factors may be considered based upon site-specific conditions for each filed and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- (j) Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- (k) Primary reference publications used herein are:
 - (1) Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
 - (2) National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
 - (3) Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc. 1991
 - (4) Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December 1992.
 - (5) Land Application of Sewage Sludge, EPA/831-B-002b, U.S. Environmental Protection Agency, December, 1994